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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,880	01/03/2007	Yoshihito Maeno	CU-4890 RJS	8758

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LADAS & PARRY LLP  
224 SOUTH MICHIGAN AVENUE  
SUITE 1600  
CHICAGO, IL 60604

EXAMINER
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ANGEBRANNDT, MARTIN J

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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04/13/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/583,880	<b>Applicant(s)</b> MAENO ET AL.	
	<b>Examiner</b> Martin J. Angebrannt	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 1/7/2010 & 12/28/09.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 40-56 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-56 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. The response of the applicant has been read and given careful consideration. Responses to the arguments of the applicant are presented after the first rejection to which they are directed. The applicant has perfected priority and is accorded the priority date of December 22, 2003 and serves to obviate a number of rejections. Rejection of the previous action not repeated below are withdrawn.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 46 and 48-50 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Oe et al. JP 2000-109510.

Oe et al. JP 2000-109510 teaches in example 22 (in table 4) alicyclic epoxy compound, CY-179 (monomer), O-1 (p-tert-butylphenyl) Iodonium hexafluorophosphate, D-3 2,5-bis[[4-(diethylamino)phenyl methylene] cyclopentanone , 2-methyl-2(p-toluenesulfonyloxy)3-keto

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butnoic acid t-butyl ester and an acrylate- methyl methacrylate co-polymer which is exposed using the 514.5 nm Ar ion laser. [0044-0047]. The use of these composition in holographic processes is disclosed. [0003,0052]. The use of various cationically polymerizable compounds and combination of these is disclosed. [0023]. The addition of ethylenenically unsaturated monomers and binders is disclosed [0028].

The position of the examiner is that given the directions to the use in forming holograms, the process forming them using the composition with an interference exposure is immediately envisioned by those skilled in the art.

The applicant argues that the compound D-3 has a different absorption form the claimed compound. It may be that the measurements were made in different solvents, but the applicants position is untenable as **the compound D-3 and the compound of claim 46 are the same compound (benzylidene is a different name for phenylmethylene)**. The rejection stands.

5. Claims 46 and 48-50 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Keys et al. '102, as evidenced by Monroe '790.

Keys et al. '102 teaches in example 55, the use of a 514 (the emission line is actually 514.5 nm) from an argon ion laser in a composition if Vinac (PVAc binder), Photomer (acrylate monomer), SR-349 (diacrylate monomer), TBPM (methacrylate monomer), HABI (photoiniator, MMT, FC and JAW (sensitizing dye) which after processing including heating forms a hologram which replays at 508 nm with a diffraction efficiency of 98%. (9/15-51,19/3-48,34/57-35/20). Useful bis(p-dialkylaminobenzylidene)ketones are disclosed by Baum 3,652,275) and include DEAW, DMJDI, and DBC (9/15-25, 8/62-9/52). Compositions 14-20 are similar, but use DEAW

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(cyclopentanone, 2,5-bis{[4-(diethylamino)-phenyl]methylene} (1912-13) as the sensitizer. The use of the media with a 488, 514 (514.5) or 645 nm laser is disclosed (15/62-64).

Monroe '790 establishes the absorption maxima and absorptivity of these sensitizing dyes (col 15).

Compound	$\lambda_{max}$	$\epsilon_{488}$	$\epsilon_{514}$	$\epsilon_{632}$
DBC	481 nm	59,200	57,400	7,200
DEAW	477 nm	74,000	65,200	3,100
DMSDI	442 nm	37,400	6,900	0
JAW	496 nm	39,600	57,600	33,300

The holographic recording compositions using DEAW are anticipated by the examples, but their use with a 514.5 nm laser is not. The examples using JAW and the 514.5 nm argon ion laser line anticipate the composition claims and method claims rejected under this heading.

The applicant argues that the compound D-3 has a different absorption form the claimed compound. It may be that the measurements were made in different solvents, but the applicants position is untenable as **the compound D-3 and the compound of claim 46 are the same compound (benzylidene is a different name for phenylmethylene)**. The rejection stands.

6. Claims 46 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keys et al. '102, in view of Monroe '790 and Baum et al. '275.

Baum et al. '275 is referred to by Keys et al. '102 for the teachings of sensitizers. The general formula is presented in column 2 and R<sub>1</sub> or R<sub>2</sub> can be hydrogen or C1-4 alkyl. (2/15-34).

It would have been obvious to one skilled in the art to modify examples 14-20 of Keys et al. '102 by using the 514.5 nm laser taught at 15/62-64 of Keys et al. '102 with a reasonable expectation of success based upon DEAW having significant absorption (molar absorptivity) between 488 and 532 nm as evidenced by Monroe '790 and further to use 2,5-(bis(4-

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butylaminobenzylidene)cyclopentanone in place of DEAW based upon the disclosure of the general formula in Baum et al. '275 and the direction to this in Keys et al. '102 for these teachings.

The applicant argues that the compound D-3 has a different absorption form the claimed compound. It may be that the measurements were made in different solvents, but the applicants position is untenable as **the compound D-3 and the compound of claim 46 are the same compound (benzylidene is a different name for phenylmethylene)**. The rejection stands. The butyl analogue is obvious in view of Baum.

7. Claims 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keys et al. '102, in view of Monroe '790 and Baum et al. '275, further in view of Asakawa et al. '598.

Asakawa et al. '598 teaches the use of dyes, such as cyclopentanones, dipehylidonium salts or combination of these salts and dyes. (19/28-30) 2,5-(bis(4-ethylaminobenzylidene) cyclopentanone is used in an example (20/30-31). The use of holographic recording is disclosed (col 19)

It would have been obvious to one skilled in the art to modify the processes rendered obvious by the combination of Keys et al. '102, Monroe '790 and Baum et al. '275 by using other photoinitiators, such as diphenyliodonium salts taught by Asakawa et al. '598 as useful with cyclopentaone sensitizers for sensitizing photopolymerizable composition useful for holographic recording with a reasonable expectation of success based upon this teaching within the art.

8. Claims 40 and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laganis et al. EP 437259.

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Example 5 in table 1 teaches a composition (page 15) comprising Squarilium dye 3, HABI (photoinitiator), TMAB, 9-vinylcarbazole (monomer), sartomer (monomer, photomer (monomer), Vinac (binder) exposed using a 633 nm HeNe laser to form a hologram with a refractive index modulation of 0.033 pages 6 and 14-15). The general formula of the dye 3 is provided on pages 2 and 3 and  $R_2$  and  $R_4$  can be C 1 to 7 alkyl. Example 12 in table 2 is similar but records using 647 nm (Kr ion laser).

It would have been obvious to one skilled in the art to modify the composition of example 5 by using a similar dye with different N substitutents (heptyl, in place of methyl) based upon the disclosure of equivalence in the formula. The length or the alkyl chain would not be expected to change the absorption significantly, noting that it is shown to be useful with 647 nm laser radiation for recording a hologram.

The applicant argues that the structure is different than that the squarilium dye of claim 40, which is admitted (the rejection is a 103, not a 102), but that compound is the N-heptyl analogue of the compound used in the cited example and the use of C1-7 alkyl moieties as the N substitutents is rendered obvious at pages 2-3.

9. Claims 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawabata et al. '340, in view of Harada et al. JP 01-287105.

Kawabata et al. '340 in example 24 uses dye 4 (15/12-13) with a cationically polymerizable compound, a free radically polymerizable monomer, a diphenyliodonium salt, and a binder (P-1) and uses 632.8 nm light to record a hologram (12/16+ and ). Other cyanine sensitizing dyes are disclosed, such as those taught by JP 01-287105 and dye 2-[[3-allyl-4-oxo-

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5-(3-n-propyl-5,6-dimethyl-2-benzothiazolidene)-ethylidene-thiazolidene]methyl]-3-ethyl-4,5-diphenylthiazolinium iodide.

Harada et al. JP 01-287105 teaches various counterions/anions for the dyes for formula A (page 1) including halides, tetrafluoroborate, hexafluorophosphate, perchlorate, methylsulfate and toluenesulfate (page 2/lower left column). Specific examples of dyes bounded by A are illustrated the lower right column of page 4 (note dye A-3). These are disclosed as useful in sensitizing onium salts. (abstract and formula III on page 3).

It would have been obvious to one skilled in the art to modify the medium of example 24 of Kawabata et al. '340, by using another disclosed dye, such as 2-[[3-allyl-4-oxo-5-(3-n-propyl-5,6-dimethyl-2-benzothiazolidene)-ethylidene-thiazolidene]methyl]3-ethyl-4,5-diphenylthiazolinium but with a different counterion with a reasonable expectation of success based upon the disclosure of equivalence in the references.

The applicant argues that the dye 4 of 1,3,5-thiadiazolidene ring which is different form that of the claim. This is admitted as the rejection is a 103 rejection and not a 102 rejection, but the applicant does not address the dye 2-[[3-allyl-4-oxo-5-(3-n-propyl-5,6-dimethyl-2-benzothiazolidene)-ethylidene-thiazolidene]methyl]3-ethyl-4,5-diphenylthiazolinium iodide taught at 5/18-19, which is the same dye as in the claims (the naming differs only in the order of recitation). The dye is used with 632.8 nm laser. The rejection stands.

10. Claims 51-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okubo et al. '324, in view of Ernst et al. DE 100571141 and Yamaguchi et al. JP 06-175554.

Okubo et al. '324 in example 21 teaches a composition of dye D-22 (see col 11-12), a photoinitiator, acrylates, an iron arene initiator. (19/65-20/25). Sample 14 teaches this is an



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iodonium salt (col 21-22) See 14/40-47 for iodonium salts. These can be used with 488 or 532 nm lasers (2/40) and for holography (1/18). Useful terminal moieties are disclosed. (col 4).

Ernst et al. DE 100571141 teaches various 2,4,6,-pyrimidinetrione compounds bounded by the formula I for sensitizing photopolymerizable compositions. Y can be S or O, X can be methylene, oxygen, or sulfur and R2 and R3 can be hydrogen, methyl or ethyl and R1 and R5 can be alkyl. (abstract and page 3/lines 1-16). These are useful in the 370-430 nm range.

Yamaguchi et al. JP 06-175554 in example 1 teaches a rhodanine dye, PMMA, an acrylate, and an iodonium salt photoinitiator which was coated and exposed to 488 nm laser light to form a hologram with 70% diffraction efficiency.[0044-0046] In examples 2-4, the 488 nm laser was used. [0047]. 514 and 633 nm lasers were also used. (see table)

To address the embodiments using compound 5 of the claims, the examiner cites Ernst et al. DE 100571141 and holds that it would have been obvious to modify the cited compositions of Okubo et al. '324 and processes using them by using other similar pyrimidinetrione compound known to sensitize photopolymer composition, such as those of Ernst et al. DE 100571141 with a reasonable expectation of successfully forming a photopolymerizable composition and recording a hologram therein with a blue laser and cites Yamaguchi et al. JP 06-175554 to establish that the use of similar rhodanine dyes to sensitize iodonium salts in holographic recording systems to 488 nm lasers is known and provide support for a reasonable expectation of success. Additionally, it would have been benzothiazolyl moieties based upon the leftmost structure at 4/25, dye D-17 and where Y is sulfur 4/38).

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kelly Cynthia can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Martin J Angebranndt  
Primary Examiner  
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/Martin J Angebranndt/  
Primary Examiner, Art Unit 1795  
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